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STATED MEETINGS

Of the Entomological Section of The Academy of Natural Sciences of Philadelphia, and of The American Entomological Society will be held at 7.30 o'clock P. M. on the following dates during 1924: January 24, February 28, March 27, April 24, May 22, September 25, October 23, November 20, and Dec. 8.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the NEWS will furnish reprints of articles over and above the twenty-five given free at the following rates: One or two pages, twenty-five copies, 35 cents; three or four pages, twenty-five copies, 70 cents; five to eight pages, twenty-five copies, $1.40; nine to twelve pages, twenty-five copies, $2.00; each half-tone plate, twenty-five copies, 30 cents; each plate of line cuts, twenty-five copies, 25 cents; greater numbers of copies will be at the corresponding multiples of these rates.

KLONEUS BABAYAGA.—SKINNER.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

VOL. XXXV JULY, 1924 No. 7

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Kloneus babayaga (Lepid.: Sphingidae).

By HENRY SKINNER.

(Plate IV.)

Kloneus babayaga, a very interesting sphinx moth, was described by me in this journal[1] as a new genus and species. It was captured by Mr. J. S. McKenzie, at the Eden Mine, Nicaragua, June 13th, 1922, and by him presented to the Academy of Natural Sciences of Philadelphia.

Oberthurion harroverii Clark[2] is a synonym of *K. babayaga*. The specimen of *babayaga* is a female and *harroverii* a male, and the latter was collected by David E. Harrower, July 21st, 1915, on the Chirripo River, Costa Rica, and presented to the Academy of Natural Sciences of Philadelphia.

The Proceedings of the New England Zoological Club, containing the description of *O. harroverii* bears the date, Cambridge, May 12, 1923, and the copy sent me bears the postmark, Boston, May 18th.

[1] ENTOMOLOGICAL NEWS, XXXIV, 138. 1923.

[2] Proc. New England Zoological Club, VIII, 58. 1923.

ENTOMOLOGICAL NEWS, containing the description of *Kloneus babayaga*, was mailed at the post-office at Philadelphia, May 4, 1923.

The type of *Oberthurion harroverii* Clark was borrowed for study and description by B. Preston Clark, September 25, 1922, and has not been returned to the Academy of Natural Sciences of Philadelphia.

The Occurrence of Nygmata in the Wings of Insecta Holometabola.

By WM. T. M. FORBES, Ithaca, New York.

(Plate V.)

It is well known that the majority of Trichoptera possess two small, apparently glandular spots on the wings, one located in the base of cell R4, and the other, somewhat less universally in cell M. Navas has christened these structures "nigmas," according to the reformed spelling of Spanish. In English we should follow the spelling of the Greek word and call them "nygmata" (singular "nygma"). The word means merely a spot or puncture, and that is all that is really known of them. On account of their presence near the center of the wing, and tendency to be absent in small species, one may suspect them of being moulting fluid glands for the imaginal moult, but I believe there is no evidence whatever on the case.

Finding that essentially the same structures are also present in the sawflies, I made a systematic search of the principal groups of insects, with the following result.

Nygmata are present in a large proportion of species of the Neuroptera (including the Planipennia), Trichoptera, Panorpata, and the Chalastogastrous Hymenoptera. They are absent in all the Hemimetabola examined, and also in the Lepidoptera and Diptera. They are also absent from the wings of Coleoptera, but the question may be raised if some of the various structures on the elytra of Coleoptera may not be homologous.

The position of the nygmata is definite in any one group, but occasionally they are present or absent in closely related forms, especially in the Hymenoptera, where they are frequently weakly developed. The various families of an order have simi-

lar arrangements, but the various orders have less in common. The following list summarizes their occurrence:

NEUROPTERA.

Sialidae: Cells R, R5, and M; sometimes more than one in a cell; sometimes none in cell M (fig. 2); absent in *Sialis*.

Ithonidae, Dilaridae, Polystoechotidae, Osmylidae (fig. 3), and the isolated genus *Porisma;* cells homologous to R4 and to R.

Psychopsidae: cell R only, and very close to base of wing.

Sialinae, Raphidiidae, Mantispidae, Sisyridae, Sympherobiidae, Hemerobiidae, Berothidae, Chrysopidae, Myrmeleonidae, Nemopteridae, Ascalaphidae, and Coniopterygidae: nygmata absent.

TRICHOPTERA.

Present in cells R4 and M; frequently absent.

PANORPATA.

Panorpa and *Panorpodes*: cells R, R5 and Cu (fig. 6).

Bittacus: cells R and R5 only (figs. 4, 5).

Merope: and apparently *Notithauma*: nygmata absent.

HYMENOPTERA.

Siricidae: second and third submarginal cells, median, third discoidal of Cresson (sometimes called first discoidal), submedian. Frequently with two nygmata in a single cell, and occasionally with three.

Xyelidae, Lydidae (fig. 1): second and third submarginal, median, first lanceolate. Weak and frequently absent in part.

Xiphydriidae: second submarginal and sometimes median only.

Tenthredinidae: second and third submarginals, or more often second submarginal only; median.

Blasticotomidae, Megalodontidae: second and third submarginals, median.

Cephidae: at base of second submarginal only.

Oryssidae and Clistogastra: absent so far as examined.

It will be noted that the Hymenoptera have the most complete set of any single order. While the homologies of the cells to those in other orders is not at all certain, the following coincidences can be recognized: cell M (median), in Hymenoptera, Trichoptera and a few Sialidae, but not in other Neuroptera, or Panorpata; cell R5 (second submarginal ?), in Hymenop-

tera, Sialidae, and Panorpata, but not in Trichoptera; cell Cu (submedian) in Hymenoptera and Panorpata only; cell 2dA (lanceolate) in Hymenoptera only. The most persistent nygma in other orders is the one in cell R, but this is not to be expected in the Hymenoptera as almost the whole of that cell is obliterated by the fusion of R and M.

In the figures I have indicated the position of nygmata as closely as possible, but have exaggerated their size.

EXPLANATION OF FIGURES IN PLATE V.

1. Hymenoptera, Lydidae, *Lyda.*
2. Neuroptera, Sialidae, *Chauliodes pectinicornis.*
3. Neuroptera, Osmylidae, *Osmylus tuberculatus.*
4, 5. Panorpata, Bittacidae, *Bittacus* (with bases of wings, more enlarged).
6. Panorpata, Panorpidae, *Panorpodes.*

Note on Phaedrotes piasus Bdv. (Lepid. : Lycaenidae).

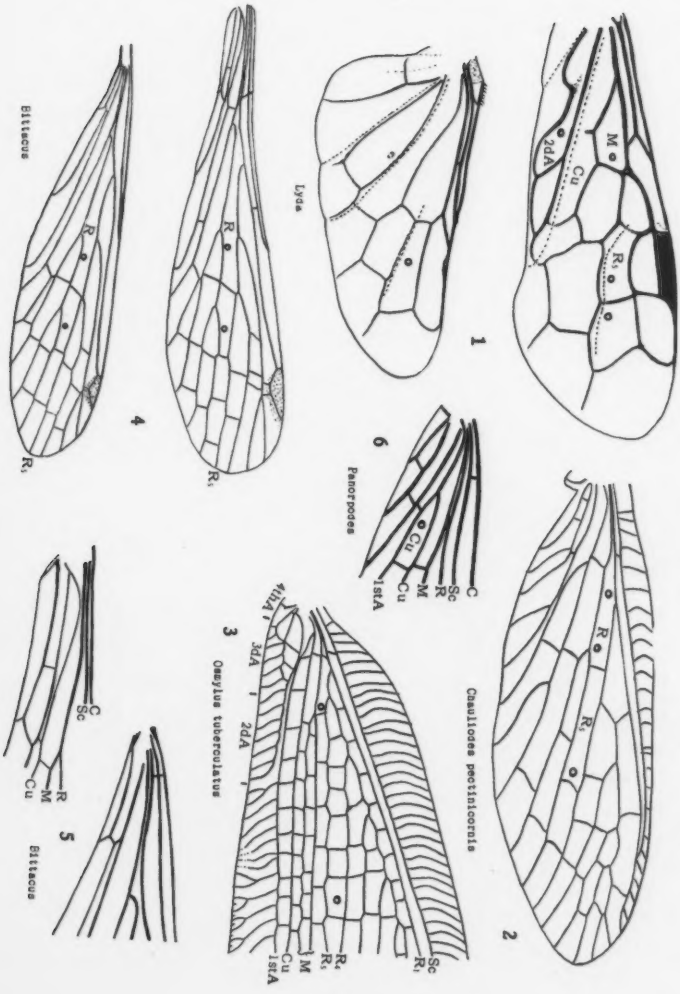
By WM. BARNES and F. H. BENJAMIN, Decatur, Illinois.

In a recent paper (1923 Ent. News XXXIV, 295-300) Mr. K. R. Coolidge requests that someone publish on the distinctions between the various races of *P. piasus.*

This has already been discussed by Dr. McDunnough (1914, Ent. Rec., XXVI, (9), 201).

There are obviously three races of the species. One is found in the mountainous regions of California, and has the underside pale grey, in general the white area rather diffuse and the subterminal lunules rather poorly defined, seldom showing any orange at the anal angle of the secondaries. This is *P. piasus piasus* Bdv., according to M. Oberthür's figure of Boisduval's type. Specimens must be compared with the types of *sagittigera* Feld., and *viaca* Edw. to be sure that these have been correctly placed. Felder's figure, however, seems to place the name; notes in a manuscript catalogue read: "Collected by Lorquin; locality indefinite; probably received thru Boisduval."

The type of *viaca* Edw. may be in the Carnegie Museum, but Dr. McDunnough evidently failed to find it. Notes read: "Type locality Sierra Nevada, California, ♂, ? Carnegie Museum." In view of the locality and original description and



NYGMATA IN WINGS.—FORBES.

in absence of any material actually compared with type, the name may tentatively rest under *P. piasus piasus*.

The name *lorquinii* Behr. (listed in the "Additions and Corrections" of the Check List as *lorquini*) apparently also falls here, the types presumably destroyed.

P. piasus catalina Reak. is the race from the vicinity of Los Angeles County, California. It is much darker grey below, the hind wing with the white less suffused and bordered by a s. t. band of well defined black crescents, which toward the anal angle are frequently bordered by yellow-orange. This race lacks ocelli to the submarginal lunules preceding the anal angle of the secondaries. A faint ocellus may be present at the anal angle. A specimen has been compared with the type of *catalina* in the Strecker Collection. M. Oberthür's figure of the type shows *rhaca* Bdv. to be a synonym.

P. piasus daunia Edw. A specimen from "Colo. Bruce," is in the Barnes Collection marked "X. T. (Pittsburgh) J. McD." This race is very close to *catalina*, the main distinction being the presence of black ocelli on the hind wings distad of the submarginal lunules preceding the anal angle.

Quite naturally intergrades between the various races occur, and probably occasional aberrational specimens from any locality might be made to "fit" each name, but in general the various races breed true and are restricted. It is quite questionable if the authors would propose a name for *daunia* if no available name were in the literature, but the tendency seems to be to "split" each species of diurnal into as many races as possible, and once a name is proposed for a form which seems to have a different geographical distribution than another form, it seems advisable to retain the name to avoid further synonyms.

In fact, many names are retained in the Check List, and in all other lists, if the insect has not been properly identified or its correct status is unknown. The work of a cataloguer is not a revisional one and must necessarily be based mainly on published work. Consequently some names listed as synonyms will ultimately be assigned to racial rank, while others listed as species will prove to be synonyms.

A Note on Some Hippoboscidae (Diptera Pupipara).

By G. F. Ferris, Stanford University, California.

Ornithoctona Speiser.

Ornithoctona strigilecula (Ferris).

1923. *Ornithomyia strigilecula* Ferris, Parasitology, 15:57-58; tf. 3-4.

Since the description of this species was published, certain material has been obtained which throws some light on the genus *Ornithoctona* and indicates the necessity of the change indicated above.

The genus was originally based upon the character of the antennae, which permitted its separation from *Ornithomyia*. The differences in the two genera, however, are not especially striking and the separation on this basis not very convincing, but the material now at hand reveals a character which very strongly reinforces that heretofore used. In my description of *Ornithomyia strigilecula* I called attention to the peculiar and apparently very distinctive transverse comb of setae on the basal segment of the posterior tarsi, a character that, as far as I am aware, had never been noted in any species. It now appears that this comb is characteristic of the species of *Ornithoctona,* it being present in two species from Borneo that are at hand and which will be described in a forthcoming paper to be published in the journal of the Sarawak Museum.

This character is very distinctive. None of the species of *Ornithomyia* that are available show anything of the sort, this segment of the posterior tarsi bearing merely a larger or smaller number of irregularly arranged, stout setae.

Ornithoica Rondani.

In all, ten species have at various times been referred to this genus. It is entirely possible that there are more names than species and in fact, Austen[1] has indicated his belief that *O. exilis* (Walker) and *O. vicina* (Walker) are identical with *O. becariina* Rondani, and in addition has expressed the suspicion that all of these are likewise identical with *O. confluenta* (Say).

[1] Austen, E. E. Notes on Hippoboscidae (Diptera Pupipara) in the Collection of the British Museum. Ann. and Mag. Nat. Hist. (7), 12:263. (1903).

Aldrich[2] accepts these views and in addition places *O. pusilla* (Schiner) and *O. promiscua* Ferris and Cole in the synonymy with *confluenta* (or *confluens* as he would have it).

On this basis *O. confluenta* becomes a species of practically cosmopolitan distribution, in itself a rather surprising thing for a form which is not known from any very wide ranging hosts. That the determinations upon which this synonymy is based are not to be relied upon is indicated by material now at hand. I have a single specimen of an *Ornithoica* from Borneo—which will be described in detail in the forthcoming paper mentioned above and which I take to be in all probability *O. becariina*. It differs very markedly from *O. promiscua* at least, but the differences are such that a Dipterist working with his conventional pinned and shriveled material would almost certainly overlook them.

It is evident from this that the earlier determinations need to be revised. In this connection I would call attention especially to the facts in regard to *O. confluenta*. In our description of *O. promiscua* Ferris and Cole, we expressed the belief that *confluenta* is unrecognizable from the original description. Nor, as far as I am aware, has the species ever been redescribed from authentic—or for that matter, any other—material. Aldrich, however (ref. cited) without adducing any evidence whatsoever in support of his opinion, cavalierly reduces *O. promiscua* to synonymy with *confluenta* as well as assigning to the latter numerous specimens from geographically widely separated regions. Until such time as *confluenta* has been redescribed from material that may be regarded as authentic, it would appear quite reasonable and proper to maintain the distinctness of *O. promiscua*.

A Chance for Lepidopterists.

Staudinger and Bang-Haas, Dresden, Blasewitz, Germany, have recently issued a price list of Lepidoptera. The specimens and species are sold in lots, representing the species in genera from various parts of the world. The prices are reduced and thus a good way is offered to start a collection at a reasonable cost.

[2] Aldrich, J. M. Notes on the Dipterous Family Hippoboscidae. Insecutor Inscitiae Menstruus 11:79. (1923).

An Analysis of a Bimodal Variation in Size of the Parasite Dasymutilla bioculata Cresson (Hymen.: Mutillidae).*

By Clarence E. Mickel,
Department of Entomology, University of Minnesota.

(Plate VI, and Text Figures.)

That there are variations in size among individuals of the same species of insect is well known among entomologists and has been the subject of a number of investigations. These have had as their object either the collection of data regarding the character and extent of the variations, or the demonstration of the causes for the phenomenon itself. The variations which are present in various species of animals and plants may be divided into two very fundamentally different classes; those which are genetic in character, and those of an ecological nature. Variations of the first class are due to some reaction that occurs in the germ plasm, while those of the second class are due to the effect of some stimulus in the environment, and are therefore ecological. The principal ecological factors which have been suggested as causes for variation in size are temperature, humidity, light, chemical stimuli and nutrition, the last-mentioned including both quantity and quality of food. An excellent review of the literature on this subject has been made by Bachmetjew (1907). In the case to be discussed the factors of temperature, humidity, light, chemical stimuli and quality of food apparently vary in a uniform manner, while the quantity of food is small in some cases and large in others.

The quantity of the food supply has been used by a number of authors to account for the variations in size which occur within the same species of insect. Koch (1856) studied the lepidopteron *Vanessa io* var. *joides* Dahl and concluded that it was a variety based on small specimens of *Vanessa io* and that their small size was due to the starvation of the larvae. Berlepsch (1860) performed an experiment with the larvae of queen bees and states that he was able to reduce the size of the

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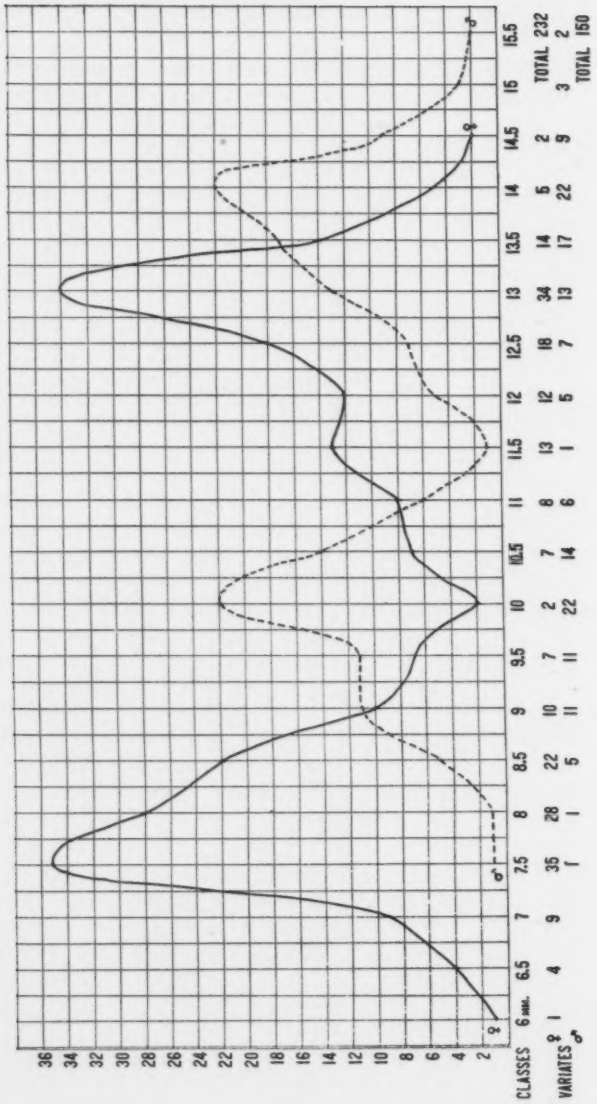


FREQUENCY CURVE OF VARIATION IN SIZE OF MALE AND FEMALE OF DASYMUTILLA BIOCULATA CRESSON.—MICKEL.

queens by reducing the food supply of the larvae. Kleine (1867) states that worker bees of inferior size are produced from poorly fed worker larvae. Brehm (1869) reared a specimen of the dipteron *Anthrax semiata* or *morio* L. from the cocoon of a bumblebee. He thought the variations in the size of this species were due to different quantities of food which were available to the larvae. Stepanow (1882) found that the larvae of the bombyliid *Systoechus leucophaens* Meigen had different sizes which he thought depended upon the quantity of food in the egg masses of the orthopteron, *Stauronotus vastor* Stevens, upon which the larvae feed. The adult flies also exhibited the same variation. Standfuss (1896) reared the larvae of *Aglia tau* L., a saturnid moth, on a subnormal amount of food and obtained adult moths which were much reduced in size. Bordage (1899) reports a similar experiment with *Atella pholanta,* a vanessid. Rudow (1900) observed the variations in size which are present in the species of various genera of the aculeate Hymenoptera and states that the quantity of food available to the larvae of these forms is undoubtedly the cause of the variations in size. Herms (1907) conducted some feeding experiments with a sarcophagid fly, *Lucilia caesar* L., in which he allowed the larvae to consume as much as they would, and varied the length of the time of feeding. These time periods varied from thirty-six hours, which seemed to be the lower limit at which adults could be secured, to an optimum period of from sixty to seventy-two hours. He obtained adult flies varying from a minimum size with thirty-six hours' feeding to the normal size which were fed for a period of sixty to seventy-two hours. Wodsedelak (1917) has carried on some interesting experiments with the larvae of a dermestid, *Trogoderma tarsale,* in which he has been able to vary their size from large to small by starving, and from small to large by feeding again. No data are available as to the effect of this sort of feeding on the adult beetles.

In all of the cases which have been reviewed it is obvious that the variations have to do with a single species. If a graph is made representing the frequency and range of any of these

variations the resulting curve is unimodal, that is, all of the specimens exhibiting variation group themselves progressively around the most abundantly represented form. If, however, the circumstances should be such that when a graph of the frequency and range of the variation is made, the resulting curve is bimodal, it is not so apparent that one is dealing with a single species. In fact, from an examination of museum specimens only, one might be led to the conclusion that two species were represented rather than one, and an investigation of the organism and its environment would be necessary before one could arrive at the true state of affairs. In cases of this kind the variation may appear to be discontinuous, but a study of the data seems to show that it is more correct to consider it as a continuous variation of the bimodal type, and such variations may well be designated as bimodal. It is conceivable that variations of this kind occur which may show curves with three or even more modes. Kellogg and Bell (1904) have mentioned the possibility of bimodal or even polymodal variations.

Dasymutilla bioculata Cresson offers a good example of variation which displays the bimodal characteristic. When a large number of individuals of this species are arranged in a gradatory series, the curve expressing the frequency and range of the differences in size is bimodal. The case is an interesting one because the variation in size can be definitely attributed to an ecological factor, and because it emphasizes the importance of a knowledge of the ecology of an insect to a taxonomist in determining specific limits.

Dasymutilla bioculata is a mutillid wasp, which is exceedingly abundant in the sand dune areas of Minnesota. My attention was first attracted to the species in making a collection of Mutillidae in a sand dune area two miles north of the city limits of Minneapolis in Anoka county. The principal collecting ground in this sand dune area is a blow-out (a depression blown out by the wind in areas of shifting sand) about ten acres in extent. During the season of 1922, nearly 1200 specimens of Mutillids were collected in this blow-out. Other species of Hymenoptera were also abundant, particularly two

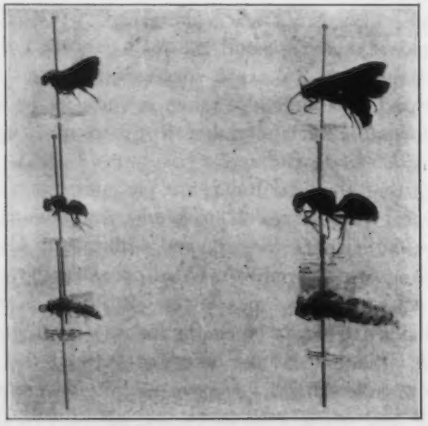
species of Bembicidae, *Bembix pruinosa* Fox and *Microbembex monodonta* Say, and the Sphecid wasp, *Sphex argentatus* Hart. In general, the hymenopterous fauna of the sand dune areas of Minnesota is very similar to that of the sand areas of Illinois, which has been discussed by Hart (1907). The collection of 1922 showed that the most abundant Mutillid in this blowout was the male *Dasymutilla bioculata* Cresson, and the female *Dasymutilla chlamydata* Melander, which was described from specimens taken in the Illinois sand areas. When this material was worked over for classification, it was found that the 440 specimens of the female *chlamydata* could be separated into two series according to size, that is, those varying between 6.5 mm. and 10 mm. and those varying between 11 mm. and 15 mm. The 206 specimens of the male *bioculata* could also be separated into two similar series. No structural characters could be found for separating these two series, either in the female *chlamydata* or the male *bioculata*. The genitalia of the males in the two series were compared, but no differences could be found. Hart (1907) first suggested that *chlamydata* was probably the female of *bioculata*, but retained the name *chlamydata* for all his specimens. During the season of 1923 specimens of the female *chlamydata* and the male *bioculata* were reared from the same host and were successfully mated in the laboratory. Specimens were also taken *in coitu* in the field. *Dasymutilla chlamydata* Melander therefore becomes a synonym of *Dasymutilla bioculata* Cresson.

Knowing that the Mutillidae are parasitic upon wasps and bees, and that the species *Microbembex monodonta* Say and *Bembix pruinosa* Fox were the most abundant Hymenoptera in the blowout, it occurred to me that probably they were parasitized by one or more species of the Mutillids. It also seemed probable that *Dasymutilla bioculata* was the Mutillid concerned, parasitizing either one or the other, or both of the Bembicids.

I therefore collected 285 cocoons of *Microbembex monodonta* on May 29 and brought them to the laboratory. Eighty-five cocoons of *Bembix pruinosa* were collected on June 30 and brought to the laboratory. Each cocoon was placed in a glass

vial so that a definite record could be kept of each one. From the 285 cocoons of *Microbembex monodonta* I obtained 6 males and 5 females of *Dasymutilla bioculata* ranging in size from 7 to 10 mm. From the 85 cocoons of *Bembix pruinosa* I obtained 1 male and 3 females of the same Mutillid ranging in size from 11 to 15 mm. When a recently emerged female of the latter group was placed with a male of the small series they mated immediately. The specimens taken in copulation in the field had the following length measurements: female, 6.5 mm. and male 11.5 mm.

The adults of *Microbembex monodonta* vary in size from 8 to 14 mm. while those of *Bembix pruinosa* vary between 16 and 19 mm. The same proportional differences exist in the size of the mature larvae of the two species. The larvae of *Dasymutilla bioculata* parasitize the cocoons of both the small *Microbembex* and the large *Bembix* and entirely consume the Bembecid larvae before they enter the prepupal stage. The specimens of *bioculata* emerging from the cocoons of the small *Microbembex* vary in size from 6.5 to 10 mm., while those



Correlation in size between *Dasymutilla bioculata* Cresson and its hosts *Microbembex monodonta* Say (left) and *Bembix pruinosa* Fox (right). In each vertical row: female above, male in the middle, host below.

which emerge from the large *Bembix* vary in size from 11 to 15 mm. Inasmuch as temperature, humidity, light, quality of food, and other ecological factors vary uniformly in this sand dune area, while we know that the quantity of food is considerably less in the *Microbembex* cocoons which produce the small *bioculata* than the amount of food in the *Bembix* cocoons which produce large *bioculata,* it seems justifiable and reasonable to conclude that the quantity of food available to the larvae of *Dasymutilla bioculata* is the factor which determines the size that the adult will be. The quantity of food may be either large or small according to the species of Bembicid which the Mutillid parasitizes.

As stated previously when a curve is plotted representing the frequency and range of the variation in size of a large number of specimens of *Dasymutilla bioculata* the curve will be found to be of the bimodal type. The first mode will represent the specimens which as larvae were parasites of *Microbembex monodonta* Say, and the second mode will represent the specimens which as larvae were parasites of *Bembix pruinosa* Fox. Thus it is clear that in this case at least, what appears from an examination of museum specimens to be a specific difference in size is in reality an ecological variation of the bimodal type, due to a difference in the quantity of the food supply. May not variations of this kind account for some of the supposedly specific differences which we encounter in other groups of insects?

Bibliography.

Bachmetjew, P. 1907. Experimentelle Entomologische Studien, ii, 299-312, 596-597, 765-768. Staatsdruckerei, Sophia.

Berlepsch, A. v. 1860. Die Biene und die Bienenzucht in honigarmen Gegenden nach dem gegenwärtigen Standpunkt der Theorie und Praxis. Mühlhausen im Thüringen.

Bordage, Edmond. 1899. Expériences sur la relation qui existe entre la couleur du Mileu et la couleur des Chrysalides de certains Lépidoptères. Proc. Fourth Int. Cong. Zool. Cambridge, 235-244. London.

Brehm, Alfred Edmund. 1869. Illustrirtes Thierleben. I. Auflage. vi. Wirbellose Thiere. Hildburghausen.

Cresson, E. T. 1865. Catalogue of Hymenoptera in the

Collection of the Entomological Society of Philadelphia, from Colorado Territory. Proc. Ent. Soc., Phila., iv, 431.

Fox, William J. 1895. Synopsis of the Bembicini of Boreal North America. Proc. Acad. Nat. Sci., Phila., 361.

Hart, Charles A. 1907. Zoological Studies in the Sand Regions of the Illinois and Mississippi River Valleys. Bull. Ill. Lab. Nat. Hist., vii, 195-272.

Herms, William B. 1907. An Ecological and Experimental Study of Sarcophagidae with Relation to Lake Debris. Journ. Exp. Zool., iv, 45-83.

Kellogg, Vernon L. and Bell, Ruby G. 1904. Studies of Variation in Insects. Proc. Wash. Acad. Sci., vi, 203-332.

Kleine, G. 1867. Ueber das Gesetz der Entwickelung der Geschlechter bei den Insekten. Zeitschr. für wissensch. Zool., xvii, 533-538.

Koch, G. 1856. Die Schmetterlinge des westlichen Deutschlands. Kassel.

Melander, A. L. 1903. Notes on North American Mutillidae, with Descriptions of New Species. Trans. Amer. Ent. Soc., xxix, 299.

Rudow. 1900. Weiterer Beitrag zu den Grössenverhältnissen der Insekten. Insekt.-Börse, xvii, no. 24, 188-189.

1900. Ueber die Grössen-Variation bei Insekten. Insekt.-Börse, xvii, no. 2, 10-11.

Say, Thomas. 1824. Narrative of an Expedition to the Source of St. Peter's River by Keating, ii, appendix, Zoology. Philadelphia.

Standfuss, M. 1896. Handbuch der paläarktischen Grossschmetterlinge für Forscher und Sammler. 2-te Auflage. (392 pp.). Jena.

Stepanow, P. G. 1882. Ueber Metamorphosen bei Dipteren der Familie Bombylidae. Arbeit. der Naturforscher-Gesellsch. bei der Univers. zu Charkow, xv, (1881), 1-9.

Wodsedalek, J. E. 1917. Five Years of Starvation of Larvae. Science, xlvi, 366-367.

Odors Attractive to Ovipositing Mosquitoes (Dipt.: Culicidae).

By S. E. Crumb, United States Bureau of Entomology.

Experiments carried on in 1923 indicate that certain odors emanating from water exercise a strong influence upon mosquitoes with regard to the place chosen for oviposition. In these experiments, which were carried on at Clarksville, Tenn., dur-

ing the period August 3 to October 1, 1923, earthenware jars, usually of two-gallon capacity, were filled three-fourths full of water to which the odorate was added. But three or four jars each provided with a different odorate were exposed simultaneously in a series and one jar of the same size as the others was filled with an equal amount of tap water as a check. The jars were kept in a darkened place outdoors and were examined daily. The results obtained with the various odors are indicated below:

Odorate	No. Nights Run	No. Egg Masses
Hydrogen Sulfide	38	11
Old Yeast Infusion	23	33
Methane	8	2
Stale Urine	22	24
Check	52	0
Indol	10	0
Hay Infusion	4	0
Ethyl Mercaptan	2	0
Rich Earth	4	0
Skatol	11	0
Carbol Dioxide	6	0

It will be noted that the first five of the substances listed above seem to have attracted ovipositing mosquitoes, while the water check did not secure a single egg mass during the 52 nights that it was exposed. It seems probable that the attractive principles involved in these experiments are all products of bacterial action since hydrogen sulfide and methane belong to this class and the yeast infusion and dilute urine only became attractive after standing about a week when they had acquired a sewage-like odor. These preferences of the ovipositing mosquitoes are possibly correlated with the food habits of the larvae which may subsist largely upon bacteria or associated Protozoa.

Adults were bred in several cases from the egg masses secured in the above experiments and all were determined by Dr. H. G. Dyar as *Culex pipiens* Linn.

This work is being continued in the hope that we may be able to discover an attractant sufficiently powerful to concentrate a large share of the mosquito oviposition in a locality in a few receptacles where the eggs or larvae may be readily destroyed.

Studies in the Genus Mecas (Coleop.).

By J. O. MARTIN, Berkeley, California.

On June 15, 1921, Mr. Vance S. Brown, Lumberman of the Lassen National Forest, collected for me, from *Artemisia tridentata,* a single specimen of a *Mecas.* The following summer I captured by beating the same shrub, which is the common sage brush, about twenty specimens of the same beetle. In Horn's table[1] to the genus *Mecas* this species runs to *inornata* (Say), but after a careful study of the literature of the genus I am convinced that a change is necessary, involving the *Saperda concolor* of LeConte. In 1824 Thomas Say described[2] the species *inornata* as a *Saperda* and distinctly states that it shows no trace of thoracic callosities. LeConte, in 1853[3], described *Saperda concolor,* but his description does not differentiate it from *inornata,* except in the shape of the elytral termination. In looking over a series of *concolor,* I have noted specimens in which the apex of the elytra have a slight break in the outline which might excuse one for calling it sub-acute. Horn, in the above cited table, was, as far as I can find, the first one to place *inornata* in the genus *Mecas.* Le Conte himself says, in the same paper in which he described *concolor* (speaking of inornata), "This is possibly the male of *S. concolor.*" It would seem therefore that *concolor* is a synonym of *inornata* and that the species of *Mecas* that has been called *inornata* is undescribed. I offer the following description and name.

Mecas bicallosa, new species.

Body black, shining throughout, which, seen through the white vestiture, gives to the species a dark lead color; length 10-13 mm. Head moderately convex on occiput and front, with coarse deep punctures which average less than the diameter of a puncture apart; each of these large punctures with a long sub-erect seta clouded with black which is darker on the front; surface between the large punctures with numerous finer ones each bearing a recumbent white hair, shorter and finer than the setae and nearly concealing the surface, these hairs are

[1] Trans. Am. Ent. Soc. VII, 1878, p. 44.
[2] Jour. Acad. N. S. Phil. III, 1824, p. 407.
[3] Jour. Acad. N. S. Phil. Ser. 2, II, 1852, p. 155.

shorter on the front. Antennae about three-fourths the length of the body; basal joint similar in punctation and vestiture to head, third and fourth joints with white hairs at base becoming black distally, giving these points an annulated appearance and with fewer of the seta bearing punctures; the remaining joints black, not annulated.

Prothorax one-fifth wider than long, slightly narrower in front, moderately arcuate on the sides, more so in the males as a rule but variable in a series; punctuation and vestiture similar to that of the head, except that the sub-erect setae are cinereous in color; on either side of the median line at about the middle is a well marked glabrous callosity, there is also a tendency for a narrow glabrous condition along the basal half of the median line, very marked in some specimens, absent in others, apparently without regard to sex.

Elytra distinctly wider at base than thorax, with punctuation and vestiture the same as head and prothorax except that the coarse punctures have a roughly lineal arrangement and become wider apart toward the apical area.

Under surface of the body and legs clothed with recumbent white hairs and setae. Tarsal claws with a well marked tooth at about the middle which is slightly larger in the males. Fifth ventral segment of the female with a longitudinal suture like median line. The male lacks this line but has a strongly marked, roundly outlined, triangular depression. The males are as a rule less robust than the females and shorter.

Described from a series of twenty specimens taken at the base of Antelope mountain in Lassen County, California, on *Artemisia tridentata. Type,* a ♀ and allotype ♂ in the collection of the California Academy of Sciences.

New Species of Ernestia and Mericia (Dipt.: Tachinidae).*

By C. HOWARD CURRAN, Ottawa, Ontario.

Since Dr. J. D. Tothill's revision of the genus *Ernestia*[1], considerable additional material has been accumulated by the Canadian National Collection and this is found to contain four well-marked new species which are described in the following pages.

* Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

[1] Can. Ent., LIII, 1922.

As shown in a recent article in this journal[2], the genus *Ernestia*, as understood by Tothill, contained two distinct genera. One of the species described below is a true *Ernestia*, the remainder belonging to the genus *Mericia*.

Ernestia (Faustia?) fasciata n. sp.

Allied to *Ernestia (Metaphyto) genalis* Coq., but the posterior claspers have no keel and the wide parafacials are normally hairy; the posterior claspers end in a laterally compressed, slightly widened elongate knob. Length 9.5 to 11 mm.

♂. Front two and one-half times as wide as length of second antennal segment. Head silvery greyish pollinose, including the blackish frontal vitta in certain lights, the middle of the face and a stripe on the inner edge of the parafacials, expanding below, reddish in ground color; parafacials two-thirds as wide as middle of face with long, rather coarse hair. Antennae black, third joint one and one-third as long as second, the third joint rectangular, slightly over one and one-half times as long as wide; arista blackish, thick on basal half, tapering to a fine point from before the middle. Palpi black, the moderately broadened apical third reddish. Vibrissae situated well above the oral margin, sometimes not strongly differentiated from the stout accompanying bristles which are more abundant than usual.

Thorax black, the mesonotum thinly greyish pollinose (almost bare), leaving two narrow darker vittae on either side. Scutellum reddish with diffuse darker base and sides. No hairs beneath the inner end of squamae. Wings cinereous hyaline, the base semi-whitish, yet the sub-basal area is darkened by brown on the veins and the small crossvein is very distinctly clouded. Squamae white. Halteres fuscous yellowish. Legs black.

Abdomen shining black, the second to fourth segments with a narrowly interrupted, greyish pollinose fascia occupying somewhat more than the basal fourth. Posterior claspers tapering from base, the sides subparallel, the apex laterally compressed so as to form an oval knob from lateral view. Outer claspers stout, sub-triangular, one and one-half times as long as wide, their sides slightly convex, not acute at apex and with small straight spine. From one to three pairs of discals on second and third segments.

♀. Front three times as wide as length of second antennal segment, normally wholly pollinose, the apex of second and narrow base of third antennal segments reddish. Mesonotum more densely pollinose, leaving five or six darker, wider vittae.

[2] Ent. News, XXXV, 214, 1924.

Holotype—♂, Cranbrook, British Columbia, May 9, 1922 (C. B. D. Garrett); No. 79, in the Canadian National Collection, Ottawa.

Allotype—♀, Okanagan Falls, British Columbia, April 24, 1919 (E. R. Buckell).

Paratypes—♂, Cranbrook, May 8, 2 ♂, May 10, 2♂, May 11, 1922 (Garrett); ♂, Penticton, British Columbia, May 10, 1919 (Buckell); ♀, Victoria, British Columbia, May 10, 1916 (R. C. Treherne).

This species is not separable from the genus *Ernestia*, notwithstanding the hairy face and wide parafacials. The genitalia are essentially the same. According to Tothill's key, the species belongs in the sub-genus *Faustia*, but I have no specimens of that genus for comparison. It apparently differs from *Faustia* in the hairy parafacials. However, in some specimens the hair is greatly reduced and is almost wanting in one.

Mericia triangularis n. sp.

Very similar to *M. aldrichi* Toth., but the front is wider and the long genital carina is flat, not acute on the posterior surface and the apex of the posterior claspers is not strongly curved; the carina is larger than in *nigropalpis* Toth., and the palpi reddish. Length, 9:5 mm.

♂. Front a little wider than the length of second antennal segment. Head silvery greyish pollinose. Antennae black; the apex of the second joint more or less reddish; third joint almost one and one-half times as long as second, not unusually wide. Arista black, thickened on basal half. Palpi reddish, their base brown.

Mesonotum thinly greyish pollinose, with five incomplete darker vittae; thorax bluish black in ground color. Scutellum scarcely reddish above. Several black hairs below inner base of squamae.

Wings greyish hyaline, the base slightly darkened. Squamae white, halteres blackish, with reddish base. Legs black.

Abdomen blue-black, the second to fourth segments thinly greyish pollinose, except a broadly interrupted apical fascia. Carina of posterior clasper long, triangular, the caudal surface flat, with just an indication of a sulcus at apex which is slightly widened. The outer claspers are not half as wide on apical as basal half, the apical portion very slightly tapering,

terminating in a long slender hook. Second and third segments each with one pair of discals.

Holotype—♂, Aweme, Manitoba, May 24, 1920 (P. N. Vroom); No. 799, in the Canadian National Collection, Ottawa.

Mericia alberta n. sp.

Similar to M. *ampelus* Walk., but the carina is longer on caudal edge, the outer claspers are very much wider, scarcely tapering on the apical half, the front distinctly wider and the genital segments normally black, the ♀ without red on abdomen. Length, 10 to 11 mm.

♂. Front as wide as length of second antennal segment. Head silvery grey pollinose. Antennae black, the third joint one and one-quarter times as long as second, its apex somewhat oblique, the upper corner being rounded off; arista black, tapering from base of ultimate section. Palpi reddish, moderately broad throughout.

Thorax shining blue-black, the dorsum with five broad grey pollinose vittae. Scutellum reddish with dark base and sides. Several strong black hairs below inner corner of squamae.

Wings cinereous hyaline, the veins bordered with brownish. Squamae white. Halteres fuscous with paler knob and base.

Abdomen bluish black, the second to fourth segments greyish pollinose except on apical fourth. Genitalia as described above. Second and third segments with one pair of discals, the latter perhaps with a weaker pair in addition as one bristle is present.

♀. Front not twice as wide as length of second antennal joint. Apical half of second antennal joint reddish.

Holotype—♂, Banff, Alberta, June 30, 1922 (6,000 ft.), (C. B. D. Garrett); No. 698, in the Canadian National Collection, Ottawa.

Allotype—♀, same locality, August 16, 1922 (Garrett).

Mericia fasciventris n. sp.

Front slightly over twice as wide, the parafacials as wide as length of second antennal segment; posterior claspers with triangular carina, gently concave behind and slightly beak-like on lower apex; outer claspers very wide on basal half, the apical half with slender almost parallel sides and a small curved apical hook. Female with the second antennal joint reddish, the apical third of the terminal abdominal segment similar in color. Length, 10 to 11 mm.

♂. Front twice as wide as length of second antennal segment. Head silvery greyish pollinose, including the broad blackish frontal vitta in certain lights; face reddish except on parafacials laterally and lower portion of cheeks. Antennae black, the apex of the second and base of third joint more or less reddish; third joint rather large, one and one-half times as long as the second. Palpi reddish with brown base.

Mesonotum greyish pollinose, leaving three wide black vittae, the median one of which is narrowly interrupted on much of its length by a slender pollinose vitta. Thorax shining black in ground color. Scutellum black, the apical half, or more, more or less clearly reddish, the whole greyish pollinose. Several conspicuous black hairs below the inner end of the squamae. Wings cinereous hyaline, the veins narrowly brownish. Squamae white. Halteres fuscous, with reddish base. Legs black.

Abdomen shining black, with more than the basal half of each segment greyish pollinose. Genitalia as described above. One pair of discals on second and third segments.

♀. Front two and one-half times as wide as length of second antennal segment. First two antennal joints reddish. Apical third or less of terminal abdominal segment reddish or obscurely so.

Holotype—♂, Aylmer, Quebec, June 1, 1923 (C. H. Curran); No. 797, in the Canadian National Collection, Ottawa.

Allotype—♀, Ottawa, Ontario (Mer Bleu), June 7, 1923 (A. Richardson).

Paratypes—♂, Chelsea, Quebec, May 30, 1923 (Richardson); ♂, Vernon, British Columbia, May 24, 1918 (W. Downes); ♀, Aweme, Manitoba, June 3, 1920 (P. Vroom).

The female is distinguished from *ampelus* Walker by the broad black base of the terminal abdominal segment. The male has the carina on the posterior claspers much as in *nigropalpis* Toth., but more pointed and the outer claspers are narrow on apical half, much as in *arcuata* Toth. Both these species have a narrow front. The carina in *aldrichi* Toth. and *longicarina* Toth. is much longer than in *fasciventris,* of different shape, and the outer claspers are quite different.

Mericia campestris n. sp.

Allied to *M. arcuata* Tothill, but readily distinguished by the much broader outer claspers as they taper slightly from the middle to the apex, instead of being narrow on apical half, and the carina on the posterior forceps is less concave. Length, 11 mm.

♂. Head silvery greyish white pollinose with a yellowish tinge in certain lights. Antennae blackish, the apex of the second and base of the third, except above, reddish; third joint one-fourth longer than second; arista brown, vibrissae situated above the anterior oral tip a distance equal to two-thirds the length of the second antennal segment; palpi reddish. Eyes separated by not over half the length of the second antennal joint.

Mesonotum black, the lateral margin and obscure sub-dorsal vittae greyish pollinose: Scutellum reddish with narrow black base and sides.

Legs black. Wings lightly infuscated. Squamae white, halteres fuscous with part of knob and base reddish. Several fine pale brownish hairs beneath inner end of squamae.

Abdomen black, the third to fifth segments reddish on the broad sides, except the narrow apex of each; abdomen thinly greyish pollinose, the apices of the segments darker, the pollen appearing somewhat tessellate in certain views. Carina of posterior forceps long, triangular, its short end somewhat concave, the apex not at all flattened or widened; the outer forceps wholly broad, still broadened at the middle and narrowed to the acute apex which bears a short, curved hook. One pair of discals on second and third segments.

Holotype—♂; Aweme, Manitoba, May 20, 1920 (P. N. Vroom); No. 795, in the Canadian National Collection, Ottawa.

Paratype—♂, Aweme, May 28, 1921 (H. A. Robertson).

A New Species of Ant from Kansas (Hym.: Formicidae).

By M. R. Smith, A. and M. College, Mississippi.

The writer has recently received a species of ant from Kansas, which appears to be new. The ants which belong to the genus *Pheidole* were found attacking the seed of sorghum at Manhattan, Kansas, by Professor W. P. Hayes. At a superficial glance one would be inclined to assign them to the species *vinelandica,* but a more careful study will bring out certain characters which are certainly distinct from those of *vinelandica.* The more important differences in the two are given in this paper. Because of the fact that this ant is apparently new and

also because of the fact that it has shown some tendency to become an economic pest in Kansas, the writer has drawn up the following description of this ant and named it *hayesi,* in honor of Professor Hayes, its collector.

Pheidole hayesi sp. nov.

Soldier. Length: 2.5 mm-3 mm.

Head, excluding mandibles, somewhat longer than broad, about as broad behind as in front, with distinctly excised posterior border, a faint, yet definite, occipital furrow and prominently rounded angular lobes; sides sub-convex to convex. Eyes small, oval, slightly convex, considerably less than one-third the distance from the anterior to the posterior corners of the head. Mandibles not strongly convex, with two prominent apical and usually one or more small basal teeth. Clypeus flattened, smooth throughout, with a pronounced excision in the anterior border, the two edges of the excision forming angulate teeth. Antennal scapes reaching to about the middle of the head, slender, distinctly curved at the base. Club as long as, or longer than, the rest of the funiculus. Frontal area triangular, impressed. Mesonotum when viewed in profile appears flattened dorsally and angulate posteriorly. Meso-epinotal constriction deep, well pronounced. Epinotum with the base as long as, or longer than, the declivity, the former broadly grooved dorsally. The spines short, coarse, the tips reflexed outward and downward. Petiole longer than broad, the sides concave. Node flattened above or with a faint excision. Postpetiole less than twice as broad as the petiole, the sides angulate or conulate. Gaster smaller than the head, subspherical.

Mandibles shining, sparsely punctate and longitudinally striated basally. Clypeus, frontal area, and the posterior half of the head smooth and shining, the latter very noticeably so. Anterior half of the head subopaque, longitudinally striated, the striations in the regions of the eyes more parallel and well defined than elsewhere. Thorax anteriorly and laterally rugulose and subopaque; the dorsal surfaces of the pronotum and mesonotum somewhat smooth and shining. The petiole laterally and ventrally punctulate, subopaque. Postpetiole, dorsally, smooth and shining. Gaster polished and shining.

Hairs pale yellowish; rather coarse, sub-erect on head, antennae and legs, longer, more erect and of unequal length on thorax, petiole, postpetiole and gaster.

Ferruginous brown; legs lighter and more yellowish, gaster dark brown.

Worker. Length: 1.5 mm-2 mm.

Head, excluding the mandibles, about as broad as long, with convex sides and a faint emargination of the posterior border. Eyes barely anterior to the middle of the sides of the head. Mandibles with two definite apical and several small, irregular, basal teeth. Clypeus smooth, with straight, entire, anterior border. Antennal scapes reaching almost to the posterior corners of the head. Frontal carinae short. Frontal area well pronounced, sub-triangular, free from ridges. Thorax somewhat similar to that of the soldier but lacking the angular humeri. Petiole as in the soldier. Postpetiole less than twice as broad as the petiole, with the sides only faintly or slightly angular but not conulate as in the soldier. Gaster smaller than the head. Femora and tibiae of legs well developed.

Head with the exception of the antennae and cheeks distinctly shining, cheeks and antennae subopaque, the former with longitudinal rugae. Dorsal surface of the pronotum and the mesonotum smooth and shining. Epinotum and the pleurae of the mesonotum punctulate, opaque. Petiole and postpetiole smooth and shining dorsally, the sides subopaque. Gaster smooth and shining.

Hairs of the same color as in the soldier, over all portions of the body, numerous and erect on the scapes and funiculi of the antennae.

Dark brown, almost black, mouth parts and appendages lighter.

Described from eleven soldiers and five workers, all of which are in the writer's collection. These specimens were sent to the writer by Professor W. P. Hayes of the Entomology Department of the Kansas State Agricultural College, Manhattan, Kansas.

Professor Hayes found this species attacking sorghum seed at Manhattan. In a letter to the writer, he stated: "They construct small earthen mounds from one and three-fourths to two inches in diameter and often carry small bits of the attacked seed to the surface, where it is scattered over the mound." Because of this seed-eating habit this ant is assuming the role of an economic pest.

After a very careful study of this species the writer feels convinced that *hayesi* is more closely related to *Pheidole vinelandica* than to any other ant of this group. Not only is this true of the general size and shape of the ant, but it is also true of its

habits. The two species are so closely related that a further study of more specimens of *hayesi* from various localities may result in *hayesi* being given subspecific rank. The sides of the head in *hayesi* are more convex than those of *vinelandica*, the posterior angles of the head of the former are more angulate than are the corners of the head of *vinelandica*, which are very broadly rounded. The thorax of *hayesi* is anteriorly and laterally rugulose, the thorax of *vinelandica* is distinctly punctulate on the sides of the mesonotum and epinotum, and particularly on the dorsal surface of the epinotum. There are also other differences of minor importance. The shape of the head and the sculpture of the thorax are the two most outstanding differences in the two.

Handy Collecting Apparatus.

By WILLIAM E. HOFFMANN, Division of Entomology, University of Minnesota.

During the past season the writer found a large number of *Microvelia hinei* Drake and set about to get as many as possible. After an hour and more of real effort the catch was counted and found to number but a dozen. This was a real disappointment as this species had not been found in such numbers before and a large series was desired. The specimens for the most part were on the surface of water only one or two inches deep. A few of them were found on the mud at the edge of the water and many more of them ran from the water to the flat mud bank when disturbed. They are unlike *M. borealis* Bueno or *M. americana* Uhler in this respect, for these species will run out upon the water when disturbed. The *M. hinei* were found in a rather restricted area on this small pond, a strip some twelve or more feet in length. They were seldom found more than three feet from the water's edge. There was a dense growth of *Typha* here and because of this and also because of the shallow water, an ordinary water net was of little use. The collecting was given up for the day with the firm conviction that some better means of collecting must be devised to take this species in numbers.

The next morning while washing dishes in our combination kitchen and laboratory, the feasibility of using a large spoon for collecting, presented itself. Accordingly, a large spoon was selected from the culinary equipment and a hole three-quarters of an inch in diameter was made in the center of it. A piece of curtain scrim, the same as used for making insect nets, was fastened over the hole by means of strips of adhesive tape. That afternoon the pond was visited again and the new piece of apparatus given a trial. The results exceeded the most optimistic expectations. It was a simple matter to dip up the water upon which the *Microvelia* stood as the surface tension of the water offered but slight resistance to the dipping of the spoon. The scrim permitted the surplus water to pass through with a film of water remaining on the surface of the spoon sufficient to force the bugs into the live bottle when the spoon was upturned. Since *Microvelia* are mounted to better advantage if not killed until a few minutes before one wishes to mount them, it is desirable to keep them alive until they are to be mounted. They may be placed in folds of damp cheese cloth, but as this is a slow and cumbersome method at best, it was decided to use a live bottle. The live bottle, however, soon became partly filled with water and had to be drained occasionally to prevent the bugs becoming water-logged. This difficulty was remedied before the next day's collecting trip by placing the bottle on an emery wheel and grinding a small hole in the bottom of it. This hole was covered with scrim in the same manner as the hole in the spoon.

In addition to *Microvelia hinei* Drake, *M. borealis* Bueno, *M. albonotata* Champion, *M. bueno*i Drake, and *M. fontinalis* Bueno, nymphs and adults, were successfully collected with this apparatus. Often three or four were taken at a time. Only the nymphs of *M. americana* Uhler could be taken in this manner as the agile adults would soon swim beyond reach. The spoon works best in shallow water and especially if there is a great deal of vegetation or drift present. Late in the fall a pond was found which was drying up and only a small pool surrounded by barren mud banks remained. Here *Gerris* nymphs

and adults, *Notonecta* nymphs and adults, and adult *Buenoa, Plea,* Corixids, Hebrids, and *Microvelia,* as well as Hydrophilid, Dytiscid and Haliplid beetles were taken. This pool was so shallow that it was impossible to collect with an insect net.

The adhesive tape held securely for several months in spite of almost daily soaking in water. The spoon, however, may be made more permanent with but very little trouble, by soldering on a piece of wire gauze in the place of the scrim. This apparatus commends itself for use not only because it enables the collector to take certain forms with more facility, but because it is cheap and easy to make and not burdensome to carry.

Note on Hydnobius matthewsii Crotch. (Col.: Silphidae).

On the morning of November 7, 1922, being then in Lassen County at an elevation of 6,500 feet, I awakened to find the ground covered by a fall of three feet of damp snow and just outside my cabin door, on the surface of the snow, took numerous specimens of two species of beetles. The first and most numerous was *Aphodius nevadensis* Horn. The second was an undoubted Silphid but would not fit into any of the tribes in Horn's Synopsis of the Silphidae in Trans. Am. Ent. Soc. VIII, 1880. Its characters, especially those of the antennae indicated the genus *Hydnobius,* but the fact that its anterior coxal cavities were open behind threw it out of the tribe Anistomini to which that genus belongs. Comparison with the description of *Hydnobius matthewsii,* by Crotch, showed it to be undoubtedly that species, and this determination was confirmed by Mr. H. C. Fall, to whom I sent specimens. On page 278 of the above cited paper, speaking of the genus *Dietta,* Horn says, "The side piece (epimeron) of the prothorax produced behind the coxae, but extremely slender, so as to be only a spine—the two not meeting in the middle," is I suspect, one of those cases in which the eyes have been deceived, as all the Anisotomini have the anterior coxae closed behind by the epimera, a fact which is sometimes demonstrable only by the separation of the thorax from the body. I have separated the thorax from the body in four specimens and find in each case a fairly wide separation of these sclerites. As *matthewsii* is the only *Hydnobius* in my collection I am unable to note as to its truth for other members of the genus. The specimens of which I took about fifty were all found within an eighth of a mile radius and outside of that limit I could find no others.—J. O. MARTIN, Berkeley, California.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JULY, 1924.

Duty on Insects Again.

In this Journal* for last October we published a brief article on the question of the importation of insects by institutions and individuals and stated the Government regulations covering such matters.

Our article was suggested by a number of complaints from entomologists and our own unpleasant experiences. Different methods and different rates were charged in other places and in some insects came in free of duty.

We suggested that the U. S. Bureau of Entomology try to clarify the atmosphere and Dr. L. O. Howard, Chief of the Bureau, took a warm interest in the subject and said he would do all he could in relation thereto. It is, however, a matter for Congress. It may be that the cause of the trouble is the fact that there are quite a number of dealers in insects who sell them solely for art and decorative purposes.

Mr. J. R. de la Torre-Bueno, Editor of the Bulletin of the Brooklyn Entomological Society, sends the following: "Regarding duty on imported insects, while it may be true that it cannot be taken up with this session of Congress, I think it is time the entomological journals throughout the country ventilated the matter thoroughly so that when the proper time comes we may be ready to present a memorial to Congress on the subject, which memorial might well be presented and passed at the Washington meeting of the Entomological Society of America this year. It might also be well, if at the proper time, entomologists throughout the country addressed to their representatives in Congress an identical letter on the subject."

HENRY SKINNER.

*Ent. News, 1923, XXXIV, p. 244.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph at the end of their respective orders. Those containing descriptions of new genera and species occurring north of Mexico are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **8**—The Entomologist's Monthly Magazine, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **19**—Bulletin of the Brooklyn Entomological Society. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipzig. **57**—Biologisches Zentralblatt, Leipzig. **68**—Science, Garrison on the Hudson, N. Y. **72**—The Annals of Applied Biology, London. **76**—Nature, London. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **78**—Bulletin Biologique de la France et de la Belgique, Paris. **80**—Revue Suisse de Zoologie, Geneve. **85**—The Journal of Experimental Zoology, Philadelphia. **93**—Bulletin, Division of the Natural History Survey, Urbana, Ill. **101**—Journal of The Linnean Society of London. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **107**—Rivista del Museo de la Plata, Buenos Aires. **116**—Entomologische Zeitschrift, Frankfurt A. M. **120**—Annalen des Naturhistorischen Museums in Wien. **124**—Bulletin de la Societe entomologique d'Egypte, Cairo. **138**—American Museum Novitates, New York. **139**—Bulletin of the Southern California Academy of Sciences, Los Angeles. **141**—Internationale Entomologische Zeitschrift, Guben. **157**—Abhandlungen der Zool.-Botan. Gesellschaft in Wien.

GENERAL. Bather, F. A.—The meaning of the terms "Binary" and "Binominal" as applied to biological nomenclature. **101**, xxxvi, 29-35. **Bruch, C.**—Estudios mirmecolo-

gicos. Con la descripcion de nuevas especies de dipteros (Phoridae) por los H. Schmitz, y Th. Borgmeier y de una aranea (Gonyleptidae) por el Dr. Mello-Leitao. **107,** xxvii, 172-220. **Campion, H.**—Obituary. **8,** 1924, 69. **Cragg, F. W.**—Obituary of. **76,** cxiii, 720-21. **Davis, J. J.**—Relation of insects to human life and to the sciences. (Proc. Indiana Ac. Sc., xxxiii, 287-97.) **Dingler, M.** — Insektenkasten mit glasboden. **141,** xviii, 18-9. **Ochs, G.**—Wissenschaftliche ziele in der entomologie und spezialisierung. **116,** xxxviii, 5-6. **Parshley, H. M.**—Latter-day horismology: A review. **19,** xix, 95-99. **Robertson, C.**—Flower visits of insects, II. **5,** xxxi, 93-111. **Torre-Bueno, J. R.**—On "N. Sp." (Editorial.) **19,** xix, 99. **Trotter, A. P.**—The language (if any) of insects. **76,** cxiii, 747. **Zukowsky, B.**—Wie ist zu sammeln. **141,** xviii, 27-30 (Cont.).

ANATOMY, PHYSIOLOGY, MEDICAL, ETC. Butschli, O.—Vorlesungen ueber vergleichende anatomie, Lief. 4, Ernahrungsorgane. Berlin. 380 pp. **Eidmann, H.**—Untersuchungen ueber die morphologie und physiologie des kaumagens von Periplaneta orientalis. **104,** cxxii, 281-307. **Ford, N.**—A comparative study of the abdominal musculature of orthopteroid insects. (Trans. R. Canada. Inst., xiv, 207-320.) **Haldane, J. B. S.**—The possible existence of a growth-regulating substance in termites. **76,** cxiii, 676. **Hanstrom, B.**—Ueber die histologie und vergleichende anatomie der sehganglien und globuli der araneen. (K. Svenska Vet.-Akad. Handl., lxi, No. 12.) **Hecht, O.**—Embryonalenwicklung und symbiose bei Camponotus ligniperda. **104,** cxxii, 173-204. **Heller, J.**—Sur la transformation des matieres albuminoides pendant la metamorphose des lepidoptere, Deilephila euphorbiae. **77,** xc, 1360-1. **Hoffman, W. A.**—The presence of an eversible gland in a midge. **10,** xxvi, 144. **MacGillivray, A. D.**—Crampton on the labium of certain Holometabola. **10,** xxvi, 133-41. **Minnich, D. E.**—The olfactory sense of the cabbage butterfly, Pieris rapae, an experimental study. **85,** xxxix, 339-56.

ARACHNIDA AND MYRIOPODA.

***Hirst, S.**—On a new mite of the genus Chorioptes parasitic on goats in the U. S. **11,** xiii, 538. ***Jacot, A. P.**—Oribatid mites: Euphthiracarus depressculus and E. flavus. (Tr. Amer. Micro. Soc., xliii, 90-6.)

THE SMALLER ORDERS OF INSECTA. Dodds, G. S.—Ecological studies of aquatic insects. Adaptations of

mayfly nymphs to swift streams. (Ecology, v, 137.48.) **Willem, V.**—Observations sur "Machilis maritima." **78,** lviii, 306-20. **Withycombe, C. L.**—Note on the economic value of the N., with special reference to the Coniopterygidae. **72,** xi, 112-25.

Calvert, P. P.—The generic characters and the species of Philogenia (Odonata). **2,** l, 1-56. **Dietz, H. F.**—Notes on the Termites of Indiana. (Proc. Indiana Ac. Sc., xxxiii, 299-301.) ***Hood, J. D.**—A new Ankothrips from New Mexico. (Thysanoptera.) **19,** xix, 66-8. **Lestage, J. A.**—Atalophlebia brieni sp. n. ephemere nouvelle du Bresil. **33,** lxiv, 21-4. ***McDunnough, J.**—New Canadian Ephemeridae with notes, II. **4,** lvi, 90-89 (Cont.). **Snyder, T. E.**—Description of a new termite from Porto Rico. **10,** xxvi, 131-2. Descriptions of n. sps. and hitherto unknown castes of termites from America and Hawaii. **50,** lxiv, Art. 6. ***Treherne, R. C.**—Thysanoptera known to occur in Canada. **4,** lvi, 82-8.

ORTHOPTERA. Morgan, W. P.—Notes on the function of the forceps of earwigs. (Proc. Indiana Ac. Sc., xxxiii, 303-6.)

HEMIPTERA. Hase, A.—Ueber die stiche der wasserwanze Notonecta glauca. **52,** lix, 143-55. **Poisson, R.**—Recherches sur le polymorphisme alaire chez les Hemipteres aquatiques. **78,** lviii, 205-305.

***Barber, H. G.**—Two new sps. of Cymus. (Lygaeidae.) **19,** xix, 87-90. **Drake, C. J.**—A new sp. of Acanthocheila from Bolivia (Tingitidae). **19,** xix, 94. **Knight, H. H.**—Atractotomus mali found in Nova Scotia. (Miridae.) **19,** xix, 65. ***McAtee, W. L.**—Notes on a collection of Erythroneura and Hymetta chiefly from Illinois, with descriptions of new forms. (Eupterygidae.) **93,** xv, 39-44. ***McAtee & Malloch**—Some annectant bugs of the superfamily Cimicoideae. **19,** xix, 69-83. **Ribaut, H.**—Etude sur le genre Triphleps (Anthocoridae). (Bul. Soc. Hist. Nat. Toulouse, li, 522-38.) **De la Torre-Bueno, J. R.**—A correction in Acalypta (Tingididae). **19,** xix, 93.

LEPIDOPTERA. Bell, E. L.—A new locality for Pamphila meskei. **19,** xix, 86. **Emeljanoff, N.**—Intersexualitat bei Lymantria dispar, unter einwirkung der temperatur. **57,** xliv, 106-10. **Grandi, G.**—Studi sullo sviluppo postembrionale delle varie razze del Bombyx mori. (An. R. Sc. Sup. Agri. Portici, xviii, 72 pp.)

***Comstock, J. A.**—Studies in Pacific coast L. **139,** xxiii, 51-2. **Mousley, H.**—Further notes on the Rhopalocera or butterflies of Hartley, Stanstead County, Quebec, 1923. (Can. Field-Nat., xxxviii, 82-3.) **Oberthur, C.**—Etudes de lepidopterologie comparee, Fasc. xxii. Le Genre Agrias, 11 col. pls. **Schaus, W.**—New sps. of Pyralidae of the subfamily Nymphulinae from tropical America. **10,** xxvi, 93-130.

DIPTERA. Aldrich, J. M.—On the nomenclature in Diptera. **10,** xxvi, 146. **Brolemann, H. W.**—L'hypopygium de Pachyrhina pyrenaica. (Bul. Soc. Hist. Nat., Toulouse, li, 472-521.) **Brues, C. T.**—Another "snow" phorid. **5,** xxxi, 92. **Campbell & Davidson** — Notes on aphidophagous Syrphidae of southern California. **139,** xxiii, 59-71. **Greene, C. T.**—The collection of immature stages of Diptera in the National museum (exclusive of Culicidae). **10,** xxvi, 146. **Gruhl, K.**—Paarungsgewohnheiten der dipteren. **104,** cxxii, 205-80. **Hearle, E.**—La lutte contre les moustiques a Banff, Alberta. (Le Natur. Canadien, 1, 210-13.) **Shannon, R. J.**—Notes on the maxillary teeth of Anopheles. **10,** xxvi, 142-3. **Worthley, H. N.**—The biology of Trichopoda pennipes, a parasite of the common squash bug. (Tachinidae.) **5,** xxxi, 57-77.

***Alexander, C. P.**—The crane-flies of New York: Second supplementary list. **19,** xix, 57-64. **Bruch, C.**—(See under General.) ***Dunn & Parker**—Fleas found on wild animals in Bitterroot Valley, Montana. (U. S. Pub. Health Serv., Reprint. No. 883.) ***Johannsen, O. A.**—A new chloropid subgenus and sp. from New York. **4,** lvi, 89. ***Melander, A. L.**—Review of the dipterous family Piophilidae. **5,** xxxi, 78-86. ***Melander & Argo**—A revision of the two-winged flies of the family Clusiidae. **50,** lxiv, Art. 11. **Shannon, H. C.**—Some common flies little known in Maine. **10,** xxvi, 146. ***Shannon & Dobroscky**—The No. American bird parasites of the genus Protocalliphora. (Jour. Wash. Ac. Sc., xiv, 247-53.)

COLEOPTERA. Altson, A. M.—On the genital system of Lyctus brunneus, with a note on L. linearis. **101,** xxxv, 581-98. **v. Lengerken, H.**—Kopftransplantation an Coleopteren. **52,** lix, 166-70.

Bruch, C.—(See under General.) **Cotton, R. T.**—The identity of Sitophilus (Calandra) rugicollis. **10,** xxvi, 141. **Dobzhansky, T.**—Die weiblichen generationsorgane der Coccineliden als artmerkmal betrachtet. **49,** xiii, 18-27.

De la Escalera, M. M.—Enumeracion de las espanolas de Dorcadion (Cerambycidae) del museo de Madrid, y descripcion de algunas formas nuevas. (Bol. R. Soc. Espanola Nat. Hist., xxiv, 191-200.) **Gibson, A.**—The occurrence of the ptinid beetle, Niptus hololeucus, in No. Am. **4,** lvi, 74-6. **Holdhaus, K.**—Das Tyrrhenisproblem. Zoogeog. untersuchungen unter besonderer berucksichtgung der koleopteren. **120,** xxxvii, 1-200. ***Knisch, A.**—Zwei neue nearktische Palpicornier (Hydrophilidae.) **124,** iv, 55-6. **Reichensperger, A.**—Neue sudamerikanische Histeriden als gaste von wanderameisen und Termiten. **80,** xxxi, 117-52.

HYMENOPTERA. Davis, W. T.—Oak apple galls destroyed by squirrels. **19,** xix, 91-3. **Wheeler & Wheeler**—The use of a tool by a sphecid wasp. **68,** lix, 486.

Bruch, C.—(See under General.) ***Cockerell, T. D. A.**—New anthophorid bees from Arizona and Wyoming. **138,** No. 113. ***Cushman, R. A.**—On the genera of the ichneumon-flies of the tribe Paniscini, with descriptions and discussion of related genera and sps. **50,** lxiv, Art. 20. **Enslin, E.**—Die blattwespengattung Tenthredo (Tenthredella.) **157,** xi, 1-96. **Santschi, F.**—Nouvelles fourmis Bresiliennes. **33,** lxiv, 1-20.

SPECIAL NOTICES.

Les insectes parasites de l'homme et des animaux domestiques par E. Seguy. Paul Lechevalier, Paris, 1924, 422 pp., 463 fig. This small octavo book is part xviii of the Encyclopedie Pratique du Naturaliste. Judging from the text, illustrations and the bibliography, it will be a very useful addition to the library of a student of this branch of entomology.

The Macrolepidoptera of the World. Fauna americana, pts. 136 to 141, include the family Hesperiidae, genera Erynnis to Thracides, by M. Draudt; and Nymphalidae, genera Halisidota to Hemihyalea, by A. Seitz.

Memorias de la Sociedad entomologica de Espana. We are glad to announce the appearance of the first number of this new serial. It contains one article by R. P. Longinos Navas, entitled Sinopsis de los Paraneuropteros (Odonatos) de la peninsula oberica, 68 pages, with some text figures.

The Naturalists' Directory, containing names, addresses and special subjects of study of professional and amateur naturalists of the United States and Canada. Samuel E. Cassino, Salem, Mass. $5.00. Published April, 1924.

ETUDES DE LEPIDOPTEROLOGIE COMPAREE par CHARLES OBERTHUR. Fascicule XXII, part I. Rennes, France. Imprimerie Oberthür, April, 1924. This part is dedicated to Jules Culot for his incomparable talent as an artist and Lepidopterist. Mr. Harold Powell has in this part, an interesting article on the migration flights of the Lepidoptera. The larger part of the number is taken up with the Nymphalid genus *Agrias*. This important paper by Mr. Oberthür comprises seventy-three pages of text, eleven plates and thirty-three figures in color and one half-tone plate with two figures. The colored plates by J. Culot are works of art and also true to nature. Mr. Oberthür has added immensely to our understanding of these lovely butterflies. There are not many species, but the species break up into a number of topomorphic forms. Some of them are a riot of beautiful colors—brown-black, blue, red, yellow, orange and green. The author gives a historical account of the genus and treats the literature in detail.—HENRY SKINNER.

OBITUARY.

LOUIS ALBERT PERINGUEY, whose name usually appeared as L. Peringuey, died February 20, 1924. He was of French descent. An obituary notice in *Nature* (London) for April 12th gives little information as to details of his life other than he had been connected with the South African Museum at Cape Town, since 1884, becoming Assistant Director under Mr. W. L. Sclater, and Director in 1905, a position held to his death. He had been general secretary of the Royal Society of South Africa and was president thereof from 1914 to 1918. He wrote extensively on South African Coleoptera—his chief work being a *Descriptive Catalogue of the South African Coleoptera,* 1893-98, which appeared in volumes 7 and 10 of the *Transactions of the South African Philosophical Society.* He published also on South African Mutillidae and Orthoptera, one of his latest entomological papers being on this last-named group in the *Annals of the South African Museum* (volume 15, 1916). In non-entomological fields he was the author of *The Stone Age in South Africa.*

Science for May 16, 1924, states: "Major FRANCIS WILLIAM CRAGG, the well-known entomological expert, who had been investigating typhus and relapsing fevers, recently left

Kassauli for Lahore, where typhus is prevalent, in order to study the disease. He contracted the disease himself and died on April 23. For some time past Major Cragg had been assistant director of the Central Research Institute at Kassauli." With Capt. Walter Scott Patton, Major Cragg was co-author of the well and favorably known *Text Book of Medical Entomology,* published by the Christian Literature Society for India in 1913. He was an M. D. of the University of Edinburgh.

ARTHUR HUGH JONES, English lepidopterist, highly esteemed for his personal qualities, but who wrote little, died February 22, 1924, at Church Gate House, Wadhurst, Sussex. He was in the banking house of Drummond, was treasurer of the Second Entomological Congress at Oxford, 1912, and of the Entomological Society of London, 1904-17, and a vice-president of the Society in 1912 and 1918.

ARTHUR LESTER LOVETT, Professor of Entomology, Oregon Agricultural College, and Oregon State Entomologist, died at his home in Corvallis, Oregon, Friday, April 25, 1924, of septicaemia poison.

Born at Neal, Kansas, August 23, 1885, he was called from us in the prime of life and at the time he was attaining national recognition as a leader among economic entomologists. Graduated from Oklahoma Agricultural and Mechanical College in 1906, Prof. Lovett acted as Entomologist for that institution and as state inspector until 1911, when he came to the Oregon Agricultural College as Assistant Entomologist. In 1917 he became head of the department of Entomology and State Entomologist for Oregon.

He paid much attention to the Diptera, especially the family Syrphidae, in which group he has described many new species from the west. During the past few years, however, little time was devoted to systematic entomology, but his untiring labor along economic lines brought him wide recognition among the fruit growers and farmers of the Northwest. Prof. Lovett was the first to use spreaders for increasing the efficiency of sprays; this practice is now common throughout the country.

Professor Lovett's untiring labor in the field of science, his winning personality and upright character won for him a legion of friends who mourn deeply his untimely end. The Institution, the State, and the scientific world have lost a loyal worker, a true friend and a man whose place will not soon be filled.

Prof. Lovett was a fellow of the American Association for the Advancement of Science and had been a Vice-President of the American Association of Economic Entomologists and a member of the Editorial Board of the Annals of the Entomological Society of America. He was a member of the California Academy of Science, Pacific Slope Entomological Society, Western Society of Naturalists, Crop Pest Institute of America, the American Crop Pest Commission and of two National Honorary Fraternities, Gamma Sigma Delta and Phi Kappa Phi.

He is survived by a widow and two children, his parents, Mr. and Mrs. H. W. Lovett, of Fort Collins, Colorado, a brother, A. E. Lovett, of Yakima, Washington, and a sister, Mrs. P. N. Annand, San Mateo, California.

W. J. CHAMBERLIN.

THOMAS NELSON ANNANDALE, D. Sc., F. R. S., Director of the Zoological Survey of India since 1916, died in Calcutta, April 10, 1924. He was born at Edinburgh in 1876, was educated at Rugby, Edinburgh University and Balliol College, Oxford, at which last he took his B. A. degree. He traveled in the Malay Peninsula in 1899, 1901-02 and 1916, and investigated the fauna of the Sea of Galilee in 1912. He joined the Service in India in July, 1904, as Deputy Superintendent of the Zoological and Anthropological Section in Bengal, and in 1906 became Superintendent of the Indian Museum, editing the *Records* and the *Annals* of the Museum since their inception in 1907. His writings, on various groups of invertebrates, include some notes on Indian species of the Dipterous genus *Phlebotomus* in volume IV of these *Records* (1910, 1911).

Dr. Annandale was very active in developing knowledge of the fauna of India by enlisting the aid of specialists to study the collections of the Indian Museum. A number of entomologists, including Americans, were among those to whom he successfully appealed.

HERBERT CAMPION, Temporary Assistant in the Entomological Department of the British Museum (Natural History) since 1921, died on January 24, 1924. He was born at 155 Sloane Street, London, S. W., England, on August 2, 1869. Frail physically, he never attended school, but overcame the difficulties and handicaps incident to acquiring an education "by his good brain, patience and great and constant love for his studies, coupled with the assistance and fellow-likings of his brother, Frederick William Campion, throughout his life." He became a shorthand clerk but in 1911 joined the newly established Imperial Bureau of Entomology until 1921, when his transfer to the British Museum occurred.

The two brothers Campion early became interested in the Odonata. Living at Walthamstow, Essex, a northeastern suburb of London, they were but a short distance from Epping Forest, which since 1882 has been "a free and inalienable public park and place of recreation" of about 5500 acres. This was a favorite collecting ground and for the seven years, 1903-1909, they gave an annual paper in *The Entomologist* on *The Dragonflies of Epping Forest,* in the familiar British style, with much local detail, forming a body of data on the distribution of a small number (about 20) species for successive years, which will surely be valuable for comparison with records of similar phenomena in other parts of the world.

In 1909 or 1910, their residence was changed to 58 Ranelagh Road, Ealing London, West, where his brother and sister continued to live after Herbert Campion's death. The series of papers on Epping Forest ceased and was replaced by *Notes on the Dragonfly Seasons* of 1910, 1911, 1912 and 1913 in the same journal, based on a number of varied localities visited by the authors and others. Besides notes on variations of several English species, these collecting years also furnished some of the material for two papers on Larval Water Mites as Dragonfly parasites (1909) and on the Prey of some Dragonflies (1914).

After becoming connected with the Imperial Bureau of Entomology, Herbert Campion's attention was directed to exotic Odonata and we have his articles on these insects from Tunisia,

West Africa, Dutch New Guinea, Australia, Macedonia and New Caledonia and on some Gomphines from South America. He also described (1916) a beautifully preserved fossil wing from the English Eocene as *Triaeschna gossi*, and in the following year (1917) published notes on *Fabricius's Types of Odonata in the British Museum*. His morphological paper, *The Antenodal Reticulation of the Wings of Agrionine Dragonflies* was published in the *Proceedings of the Academy of Natural Sciences of Philadelphia* for 1913, the only one to appear first on this side of the Atlantic. In it he came to the conclusion that,

We have evidence of the former existence of at least seven antenodals, of which the second and fourth alone persist in the greater number of recent Agrioninae. In a hypothetical wing, including all the antenodal cross-veins of which indications have so far been afforded by morphology and tetratology, the fourth antenodal is that which coincides with the arculus, and this fact enables one to recognize it in all other Agrionine wings. . . . . In our reconstructed wing, then, we have seven antenodal cross-veins, disposed in the following manner: Nos. 1, 2 and 3 placed before the level of the arculus; No. 4 coinciding more or less exactly with the arculus, and Nos. 5, 6 and 7 lying between the level of the arculus and the nodus.

In the year preceding his death his letters mention his working on East African Odonata and his hopes to describe certain interesting species from the Philippines, as well as the possibility of studying a large consignment from Java. Whether sufficient had been accomplished to permit of publication we do not know.

Mr. Campion was a kind and helpful correspondent and his connections with the British Museum made his assistance very valuable. In more than one case has the writer of these lines had the pleasure of printing acknowledgments of his aid. With keen regret we feel his departure and tender our sincere sympathy to his surviving brother and sister.

[The writer is indebted to Mr. F. W. Campion for the date and place of his brother's birth and for some other data. Some facts have been drawn from two obituaries in *The Entomologist* and in *The Entomologist's Monthly Magazine* for March. The greater part of the above notice, however, is based on Mr. Herbert Campion's published papers and one of his letters.] PHILIP P. CALVERT.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted in exchange or cash 1000 Precis orithya ♂, Precis isoratia ♂, Precis mevaria ♂. A. F. Porter, 104 W. Broadway, Decorah, Iowa.

Cynipidae. Galls and bred wasps wanted to determine or in exchange. Alfred C. Kinsey, Indiana University, Bloomington, Indiana.

Wanted—Saturnioidea and their living pupae, especially io, luna and Anisota. D. M. Bates, Agric. Exp. Sta., Gainesville, Fla.

For Exchange.—Living pupae of Automeris io and Papilio asterias and unnamed coleoptera from India for Catocalae or N. A. coleoptera. Mrs. Robert Milde, Lewiston, Minnesota.

For Exchange.—I have for exchange live pupae of Sphinx Chersis, for other pupae or Lepidoptera in papers, Southern specimens. V. Tykal, 2412 S. Harding Ave., Chicago, Ill.

Will pay cash for specimens of rare and unusual **Scarabaeidae** (named—Leng's Catalogue). Send list and prices to Wm. C. Wood. 51 Fifth Ave., New York, N. Y.

Wanted—Psyche, Vols. I, XI, XIII, and Bulletin, Brooklyn Entomological Society, Vols. I, II, III. H. C. Severin, State Entomologist, Brookings, South Dakota.

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